IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claim 1 (Currently Amended): A noise suppression device comprising:

a time to frequency converter ~~for performing~~ configured to perform frequency analyzation of an input time domain signal for conversion to an amplitude spectrum;

a ~~circuit for obtaining~~ noise spectrum unit configured to obtain a noise spectrum ~~from~~ of the input time domain signal[[,]];

a ~~circuit for obtaining~~ signal to noise calculator configured to obtain a signal to noise ratio from the amplitude spectrum and the noise spectrum[[,]];

a perceptual weight ~~control circuit for controlling~~ controller configured to control, based on the signal to noise ratio, first and second perceptual weights ~~for use in performing perceptual weighting in accordance with spectra~~;

a spectrum subtracter ~~for subtracting~~ configured to subtract from said amplitude spectrum a product of said noise spectrum and the first perceptual weight as controlled by said perceptual weight ~~control circuit~~ controller;

a spectrum amplitude suppressor ~~for multiplying~~ configured to multiply a spectrum obtained from said spectrum subtracter ~~circuit~~ by the second perceptual weight as controlled by said perceptual weight controller ~~control circuit~~[[,]]; and

a frequency to time converter ~~circuit for converting~~ configured to convert an output of said spectrum amplitude suppressor ~~circuit~~ to a time domain signal.

Claim 2 (Currently Amended): The noise suppression device as recited in claim 1, wherein said perceptual weight ~~control circuit~~ controller is operable to let said first and

second perceptual weights become larger at certain frequencies with increased signal to noise ratios while letting said first and second perceptual weights be smaller at frequencies with reduced signal to noise ratios.

Claim 3 (Currently Amended): The noise suppression device as recited in claim 1, further comprising: a perceptual weight modifier ~~for modifying~~ configured to modify at least one of the first and second perceptual weights at a ratio of a high frequency power to a low frequency power of any one of an input signal amplitude spectrum, ~~and~~ a noise spectrum, ~~as well as~~ and an average spectrum of the input signal amplitude spectrum and the noise spectrum.

Claim 4 (Currently Amended): The noise suppression device as recited in claim 1, further comprising: a perceptual weight modifier ~~for modifying~~ configured to modify the first and second perceptual weights based on a determination result as to whether an input signal is a noise or an audio component.

Claim 5 (Currently Amended): The noise suppression device as recited in claim 1, wherein[[,]] ~~in case~~ the spectrum subtractor is further configured to perform fill-up processing, when a subtraction result of said spectrum subtracter is negative or zero, ~~fill-up processing is done~~ to a spectrum obtained by multiplying a third perceptual weight to a specified spectrum.

Claim 6 (Original): The noise suppression device as recited in claim 5, wherein said specified spectrum is one of an input signal amplitude spectrum, a noise spectrum, and an average spectrum of the input amplitude spectrum and the noise spectrum.

Claim 7 (Currently Amended): The noise suppression device as recited in claim 5, ~~wherein~~ further comprising means for modifying the third perceptual weight ~~is modified~~ at a ratio of a high frequency power to a low frequency power of at least one of an input signal amplitude spectrum, ~~and~~ a noise spectrum, ~~as well as~~ and an average spectrum of the input signal amplitude spectrum and the noise spectrum.

Claim 8 (Currently Amended): The noise suppression device as recited in claim 5, ~~wherein~~ further comprising means for controlling the third perceptual weight ~~is controlled depending~~ based on the signal to noise ratio.

Claim 9 (Currently Amended): The noise suppression device as recited in claim 5, ~~wherein~~ further comprising a perceptual weight adjuster configured to adjust the third perceptual weight ~~is adjusted~~ in value through multiplication of a ratio of an input signal amplitude spectrum and an average noise spectrum.

Claim 10 (Original): The noise suppression device as recited in claim 1, wherein at least one perceptual weight is externally controlled or selected.

Claim 11 (New): The noise suppression device as recited in claim 1, further comprising: a noise similarity analyzer configured to obtain a coefficient based on a noise similarity level of the input time domain signal, wherein the noise spectrum unit is further configured to obtain the noise spectrum based on the coefficient and the amplitude spectrum.

Claim 12 (New): A method for noise suppression, comprising:

generating an amplitude spectrum from an input time domain signal;

generating a noise spectrum of the input time domain signal;

determining a signal to noise ratio from the amplitude spectrum and the noise spectrum;

controlling, based on the signal to noise ratio, a first perceptual weight and a second perceptual weight;

subtracting from the amplitude spectrum a product of the noise spectrum and the first perceptual weight controlled on the basis of the signal to noise ratio, to generate a noise-removed spectrum;

multiplying the noise-removed spectrum by the second perceptual weight controlled on the basis of the signal to noise ratio, to generate a noise-suppressed spectrum; and

converting the noise-suppressed spectrum to an output time domain signal.

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Claim 13 (New): The method as recited in claim 12, wherein the step of controlling comprises:

increasing the first perceptual weight and the second perceptual weight at frequencies with increased signal to noise ratios; and

decreasing the first perceptual weight and the second perceptual weight at frequencies with reduced signal to noise ratios.

Claim 14 (New): The method as recited in claim 12, further comprising: modifying at least one of the first perceptual weight and the second perceptual weight at a ratio of a high frequency power to a low frequency power of any one of an input signal amplitude spectrum, a noise spectrum, and an average spectrum of the input signal amplitude spectrum and the noise spectrum.

Claim 15 (New): The method as recited in claim 12, further comprising: modifying the first perceptual weight and the second perceptual weight, based on a determination result as to whether an input signal is a noise component or an audio component.

Claim 16 (New): The method as recited in claim 12, further comprising: performing fill-up processing, when a subtraction result of said spectrum subtracter is negative or zero, to a spectrum obtained by multiplying a third perceptual weight to a specified spectrum.

Claim 17 (New): The method as recited in claim 16, wherein said specified spectrum is one of an input signal amplitude spectrum, a noise spectrum, and an average spectrum of the input amplitude spectrum and the noise spectrum.

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Claim 18 (New): The method as recited in claim 16, further comprising: modifying the third perceptual weight at a ratio of a high frequency power to a low frequency power of at least one of an input signal amplitude spectrum, a noise spectrum, and an average spectrum of the input signal amplitude spectrum and the noise spectrum.

Claim 19 (New): The method as recited in claim 16, further comprising: controlling the third perceptual weight based on the signal to noise ratio.

Claim 20 (New): The method as recited in claim 16, further comprising: adjusting the third perceptual weight in value through multiplication of a ratio of an input signal amplitude spectrum and an average noise spectrum.

Claim 21 (New): The method as recited in claim 1, wherein the step of controlling comprises: externally selecting one of the first perceptual weight and the second perceptual weight.

Claim 22 (New): The method as recited in Claim 1, further comprising: determining a coefficient from a noise similarity level of the input time domain signal,

wherein the step of generating the noise spectrum comprises: generating the noise spectrum based on the coefficient and the amplitude spectrum.

Claim 23 (New): A noise suppression device comprising:

a time to frequency converter configured to perform frequency analyzation of an input time domain signal for conversion to an amplitude spectrum;

a circuit noise spectrum unit configured to obtain a noise spectrum of the input time domain signal;

signal to noise calculator configured to obtain a signal to noise ratio from the amplitude spectrum and the noise spectrum;

a perceptual weight controller configured to control, based on the signal to noise ratio, first and second perceptual weights;

means for subtracting from the amplitude spectrum a product of the noise spectrum and the first perceptual weight as controlled by the perceptual weight controller;

means for multiplying a spectrum obtained from the means for subtracting by the second perceptual weight as controlled by the perceptual weight controller; and

a frequency to time converter configured to convert an output of the means for multiplying to a time domain signal.

Claim 24 (New): A noise-suppressed time domain signal generated by a noise suppression method comprising:

generating an amplitude spectrum from an input time domain signal;

generating a noise spectrum of the input time domain signal;

determining a signal to noise ratio from the amplitude spectrum and the noise spectrum;

controlling, based on the signal to noise ratio, a first perceptual weight and a second perceptual weight;

subtracting from the amplitude spectrum a product of the noise spectrum and the first perceptual weight controlled on the basis of the signal to noise ratio, to generate a noise-removed spectrum;

multiplying the noise-removed spectrum by the second perceptual weight controlled on the basis of the signal to noise ratio, to generate a noise-suppressed spectrum; and

converting the noise-suppressed spectrum to an output time domain signal.

Claim 25 (New): A noise suppression device for suppressing noise other than an objective signal contained in an input signal, comprising:

means for controlling first and second perceptual weights for use in performing perceptual weighting according to the input signal; and

means for performing a spectral subtraction using said controlled first perceptual weight and for performing a spectral amplitude suppression using said controlled second perceptual weight about an amplitude spectrum of said input signal.

Claim 26 (New): The noise suppression device set forth in claim 25, wherein the first perceptual weight is controlled in such a way as to let the subtraction amount increase with increasing signal-to-noise ratio; and

wherein the second perceptual weight is controlled in such a way as to let the amplitude suppression amount decrease with increasing signal-to-noise ratio.

Claim 27 (New): The noise suppression device set forth in 26, wherein the first and the second perceptual weights perform perceptual weighting according to the frequency of the spectrum of the input signal.

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Claim 28 (New): The noise suppression device set forth in claim 25, wherein the first perceptual weight performs perceptual weighting according to a gradient in such a way as to let the subtraction amount decrease with increasing frequency of the spectrum of the input signal.

Claim 29 (New): The noise suppression device set forth in claim 28, wherein the gradient of the first perceptual weight is controlled in such a way as to become steep with increasing signal-to-noise ratio.

Claim 30 (New): The noise suppression device set forth in claim 25, wherein the second perceptual weight performs perceptual weighting according to a gradient in such a way as to let the amplitude suppression amount increase with increasing frequency of the spectrum of the input signal.

Claim 31 (New): The noise suppression device set forth in claim 30, wherein the gradient of the second perceptual weight is controlled in such a way as to become moderate with increasing signal-to-noise ratio.

Claim 32 (New): The noise suppression device set forth in claim 25, wherein the first perceptual weight performs perceptual weighting according to a gradient in such a way as to let the subtraction amount decrease with increasing frequency of the spectrum of the input signal; and

wherein the second perceptual weight performs perceptual weighting according to a gradient in such a way as to let the amplitude suppression amount increase with increasing frequency of the spectrum of the input signal.

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Claim 33 (New): The noise suppression device set forth in claim 32, wherein the gradient of the first perceptual weight is controlled in such a way as to become steep with increasing signal-to-noise ratio; and

wherein the gradient of the second perceptual weight is controlled in such a way as to become moderate with increasing signal-to-noise ratio.

Claim 34 (New): The noise suppression device set forth in 25, wherein the first and the second perceptual weights perform perceptual weighting according to the frequency of the spectrum of the input signal.

Claim 35 (New): A noise suppression method of suppressing noise other than an objective signal contained in an input signal, comprising the steps of:

controlling first and second perceptual weights for use in performing perceptual weighting according to the input signal;

performing a spectral subtraction using said controlled first perceptual weight and a spectral amplitude suppression using said controlled second perceptual weight about an amplitude spectrum of said input signal.

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